Electromagnetic waves at radio frequencies

It may be of general interest to amplify the Note on D. E. Hughes in the October 1967 *Bulletin.*

David Edward Hughes (1830–1900), a musical and modest Welshman, was born in London but educated in Virginia. At 19 he was Professor of Music at Bardstown College in Kentucky: later he occupied the Chair of Natural Philosophy as well. During this period he conceived the idea of a printing telegraph. His improvements to the teleprinter were such a success that he came back to England in the hope of getting it taken up by the Electric Telegraph Company; but failing in this he went to the Continent where his invention was very well received: he was showered with Royal medals and decorations. The accumulation of what became a very large fortune also began.

Being now well off, he settled in London and devoted himself to experimental research, using simple apparatus made by himself. He invented the microphone in 1878 and soon found that a microphone contact (later called a coherer) greatly improved the detection of what he called "aerial electric waves" produced by a spark discharge. The microphone was in series with the aerial and a telephone. He did not, of course, understand its action, but he was able to transmit wireless signals from his rooms for 500 yards down Great Portland Street. It is an extraordinary coincidence that this momentous achievement, the development of which now enables us to direct the movements of apparatus on the Moon, should have taken place almost in the 'backyard' of the present Broadcasting House.

Hughes invited Fellows of the Royal Society to see some demonstrations in 1879 and 1880. They were greatly impressed: unfortunately, however, Sir G. Gabriel Stokes said that the effects were merely due to induction, but were worth describing in a paper. Hughes was discouraged, did not write the paper, and abandoned his experiments. He was, nevertheless, made a Fellow later in 1880 and received the Gold Medal in 1885 for his researches in electricity and magnetism, and the invention of the microphone and induction balance. The latter instrument was used successfully to find the bullet in the body of the assassinated President of the United States (Garfield).

Hughes admired Hertz's demonstration in 1888 of the 'optical' properties of the electric waves, readily admitting that Hertz had been the first to publish, and remarked that it was done with a detector far less sensitive than his own. (Hertz's much cruder receiver could only detect up to a distance of 22 metres.) He left nearly half a million pounds when he died in 1900. Most of it went to four hospitals, but he left many thousands for scholarships and prizes to English and French scientific societies: one well-known prize is the Hughes Medal of the Royal Society. It is strange that the Royal Society did not give him an obituary notice.

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References

Süsskind, C., 1964, *Isis*, **55**, 32–42.
Munro, J., 1899, *The Electrical Review*, **44**, 883–5.
The Electrician, 1899, **XLIII**, 40–41.
Obituary Notice, 1900, *J. Elect. Engnrs*, **29**, 951.